IV. REMARKS

A. Introduction

Claims 1-119 were rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which allegedly was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors at the time the invention was filed, had possession of the claimed invention. In particular, the Examiner alleges that no support in the specification as originally filed could be found for the claim amendments adding the language "operates independently." For the reasons discussed below, Applicants submit that there is support for these amendments, and, accordingly, Applicants respectfully traverse this rejection.

Claims 1-4, 10-14, 17-21, 28-34, 45-46, 50-58, 61, 65-68, 76-78, 81, 85 and 100-102 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,729, 228 to Franaszek et al. ("Franaszek") or U.S. Patent No. 5,109,226 to MacLean, Jr. et al. ("MacLean"). Claims 1-5, 10-15, 17-22, 28-34, 45-46, 50-59, 61, 65-69, 76-79, 81, 85, and 100-102 were rejected under 35 U.S.C. 102(e) as anticipated by U.S. Patent No. 6,304,197 B1 to Freking et al. ("Freking"). Claims 6-8, 16, 23-25, 27, 47-48, 60, 63-64, 70-75, 80, 82-84 and 103-112 were rejected under 35 U.S.C. 102(b) as anticipated by Franaszek. Claims 5, 15, 22, 59, 69, and 79 were rejected under 35 U.S.C. § 102(b) as anticipated by MacLean. Claims 35-38, 40-43, and 86-99 were rejected under 35 U.S.C. § 103(a) as unpatentable over Franaszek in view of U.S. Patent No. 5,608,396 to Cheng et al. ("Cheng"). Claims 113-119 were rejected under 35 U.S.C. § 103(a) as unpatentable over Franaszek. For the reasons discussed below, Applicants respectfully traverse these rejections.

Claims 9, 26, 39, 44, 49, and 62 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

B. Prior Art and Section 112 Rejections

Each of the rejected claims was rejected either under § 102 in view of Franaszek, Freking, or MacLean, or § 103 in view of Franaszek individually or in combination with Cheng. For the reasons discussed below, Applicants respectfully traverse these claim rejections and submit that Franaszek, Freking, and MacLean, either individually or in combination with the other cited patents, do not teach Applicants' claimed invention.

In particular, as discussed in Applicants' March 26, 2003 Response to Non-Final Office Action, Applicants submit that their claimed invention can be distinguished from Franaszek and MacLean for at least the reason that each of the parallel compression engines in Applicants' claimed invention <u>operate independently</u> of the other engines. On the other hand, the operation of each of the compression engines in Franaszek and MacLean is <u>dependent</u> on the other engines, and thus they do not operate independently.

In Franaszek, the compression engines, referred to as "compressors," "cooperatively construct a dynamic compression dictionary and compress the sub-blocks in parallel using the dictionary." *See* Abstract and Fig. 2. *See also* Col. 1, lines 48-50: "The present invention alleviates the above-described problem with dictionary type coding by introducing cooperation among the compressors." Furthermore: "Since the compressed sub-blocks were encoded using a logically shared dictionary, a logically shared dictionary 345 is required for the decompression." Col. 3, lines 26-28. Thus, as discussed in more detail below, unlike Applicants' claimed invention, the compression engines in Franaszek use a "logically shared dictionary" and therefore do <u>not</u> operate independently.

The Examiner states that "Franaszek shows in Fig. 2 a shared dictionary but in Fig. [*sic*] shows a plurality of dictionary one associated with each compressor." It is not clear what teachings in Franaszek the Examiner is referring to, and Applicants request clarification. To the extent the Examiner is referring to Fig. 7, Applicants direct the Examiner to Col. 5, lines 32-45, which discusses

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Fig. 7 and notes that each decompressor in Fig. 7 has an internal dictionary which are internal copies of the same dictionary "(the logically shared dictionary 345 of Fig. 3)." Thus, the decompressors do not each have an independent dictionary.

Similarly, each of the compression engines of MacLean, referred to as "compaction processors," is dependent on the other engines/processors. In MacLean, the data to be compacted is divided into equal sized sets of data for each compaction processor. *See* Col. 2, lines 58-60. Each compaction processor must process the data directed to it in a known maximum amount of time. *See* Abstract. Also: "Each additional compaction processor affects the statistics format of the entire compaction process." Col. 5, lines 34-35. *See also* Fig. 1. Furthermore, the timing of the processing of each compaction processor is dependent on the timing of the preceding compaction processor in a sequence. For example, MacLean states that: "the signal A-mout transfers the control from one CP [compaction processor] unit to the next. On the write cycle, which is when the data stream from the host is compacted and written onto the tape media, the stream of data is directed to all storage devices in the A section of the compaction processor. The storage device 136 signals the event counter 132, that one set of data has been received, i.e., 512 bytes. The event counter 132, in turn, signals the interface control 134 unit that CP1 [compaction processor 1] has received its section of data, i.e., one set, and the next set of data should be received by CP2 [compaction processor 2]." *See* Col. 7, line 24 to Col. 8, line 18. For at least these reasons, MacLean does not teach Applicants' claimed invention.

The Examiner asserts that the above referenced teachings of MacLean do not show less independence between the compression engines of MacLean versus the compression engines of Applicants' claimed invention. Applicants respectfully disagree. In particular, Applicants note that the Examiner has not addressed the teachings of MacLean that state that "Each additional compaction processor affects the statistics format of the entire compaction process." Col. 5, lines 34-35. *See also* Fig. 1. As is discussed in more detail below, Applicants' compression engines operate independently

for at least the reason that they do not use a logically shared dictionary, but have their own independent dictionaries which do not affect the other dictionaries. Particularly in view of the above quoted language from MacLean that notes that "Each additional compaction processor affects the statistics format of the entire compaction process," the Examiner has not shown any teachings in MacLean reflecting that the compaction processors have their own independent dictionaries. To the contrary, MacLean appears to teach away from the concept of each compaction processor having its own independent dictionary, especially in view of the above-quoted passage and the fact that the data is divided into equal sized sets of data for each compaction processor, each compaction processor must process the data directed to it in a known maximum amount of time and the timing of each processor is dependent upon the timing of the preceding processor.

Applicants also submit that the Freking patent is not relevant to Applicants claimed invention. Freking does not pertain to a system or method for compressing respective portions of data in parallel. Rather, Freking pertains to data compression wherein after compression the resulting data elements may be separated and processed in parallel. Freking discusses the variable-length coding (VLC) digital signal processing technique which is often used to compress data. Freking notes that in the prior art there is no discernible demarcation between the data elements resulting from the VLC technique. However, Freking describes a means of separating and processing multiple data elements in parallel after VLC compression. *See* Col. 1, lines 18-61, Col. 4, lines 64-65, and Col. 5, lines 15-45. Freking does not describe compressing such data in parallel.

The Examiner appears to assert that Freking is relevant to Applicants' claimed invention in that it discloses variable length encoders operating in parallel. The Examiner cites to Col. 8, lines 20-63 of Freking for support. Applicants note that the passage the Examiner cited from Freking does not teach parallel compression engines, wherein each of the engines operates independently and

implements a parallel data compression algorithm: Accordingly, the Examiner has not provided adequate support of his claim rejections in view of the Freking patent.

As discussed above, the compression engines in Applicants' claimed invention operate independently for at least the reason that they do not require use of a logically shared dictionary and instead have their own independent dictionary. For example, Applicants' patent application states that: "In one embodiment, each parallel compression engine 570A, 570B, 570C and 570D has its own history buffer." Page 13, lines 4-5. Applicants' application further states that:

> In one embodiment, each of the parallel compression engines may implement a different type of parallel dictionary based (or LZ-based) compression. For example, a first parallel compression engine may implement a parallel LZ compression scheme according to or similar to U.S. Patent No. 6,208,273 using tag-based encoding techniques, wherein tag bits are used to differentiate among compressed and "raw" (uncompressed) data characters or symbols. In this example, a second parallel compression engine may implement a parallel LZ compression scheme according to or similar to U.S. Patent No. 6,208,273 using an escape character (or sequence) to indicate the beginning of (or differentiate between) compressed and "raw" data streams (and not using tag-based encoding techniques), etc. A third parallel compression engine may implement a parallel LZ compression scheme according to or similar to U.S. Patent No. 6,208,273, wherein the history buffer is pre-loaded with all 256 possible symbols, and thus all received data is compressed (with a pointer to a previous entry in the history buffer). In this third parallel compression engine, tags or escape characters are not required to differentiate among compressed and raw data characters, as all characters or symbols are compressed (with a pointer to a previous entry in the history buffer).

Page 18, lines 5-20.

Again, Applicants respectfully submit that the Examiner has not provided any support in the cited prior art for teachings which reflect compression engines operating independently in the manner set forth in the above excerpts from Applicants' application. Furthermore, Applicants note that at least the above-cited passages reflect that Applicants were indeed in possession of the claimed invention at the time the application was filed. Accordingly, Applicants respectfully request that the Examiner withdraw the § 112, ¶ 1 rejection.

For at least these reasons, Applicants submit that their independent claims are allowable over Franaszek, Freking, and MacLean, either individually or in combination with the other cited patents. Applicants further submit that the dependent claims are allowable for at least these same reasons.

C.   Applicant's Information Disclosure Statement

Finally, Applicants respectfully request that the Examiner consider the references cited in the information disclosure statement submitted by Applicants on April 21, 2003. This information disclosure statement was filed by Applicants prior to the April 30, 2003 mailing date of the Examiner's final office action and should be considered.

V. CONCLUSION

In view of the remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is requested to telephone the undersigned at (512) 370-2858.

Respectfully submitted,

Michael P. Adams
Attorney for Applicant(s)
Reg. No. 34,763

CERTIFICATION UNDER 37 C.F.R. § 1.8

I hereby certify that this correspondence (along with any item referred to as being enclosed herewith) is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on June 30, 2003.

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